Symphyotrichum lowrieanum

Lowrie's Aster

Asteraceae

Symphyotrichum lowrieanum courtesy Stephanie Brundage, Lady Bird Johnson Wildflower Center

***Symphyotrichum lowrieanum* Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
State Forest Fire Service & Forestry
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Symphyotrichum lowrieanum (Lowrie's Aster) is a rhizomatous perennial herb in the Asteraceae. The relatively smooth, slender stems usually range between 0.3–1.3 meters in height although some plants can be taller. The leaves are heart-shaped at the base, smooth, thickish, toothed, and attached to the stem by a winged petiole. Mac Elwee (1900) reported an average leaf size of 7 x 3.5 cm for *S. lowrieanum*, and Hill (1980) noted that the upper side of the leaves can have a somewhat greasy feel. The inflorescence has spreading or ascending branches with small, leafy bracts. Like most members of the aster family, the flowers of *S. lowrieanum* are composite heads of both ray and disc florets. The 10–15 disc florets are bisexual and fertile with cream to yellow corollas that become reddish or purple as they mature and the 10–15 ray florets are pistillate (female) and pale blue to whitish. The bracts at the base of the flower heads are marked with a short, diamond-shaped green blaze. *Symphyotrichum lowrieanum* is very similar to *S. cordifolium* and some authors treat them as conspecific (See Synonyms section). However, the leaves of *S. cordifolium* are thinner, hairy on the undersides, and lack prominent wings on the petioles. Additionally, the inflorescences of *S. cordifolium* are usually densely flowered while those of *S. lowrieanum* tend to have less numerous flower heads. (See Porter 1889, Britton and Brown 1913, Fernald 1950, Gleason and Cronquist 1991, Brouillet et al. 2020, Weakley et al. 2022).

Left: Britton and Brown 1913, courtesy USDA NRCS 2022a. Right: Stem and leaves Courtesy Stephanie Brundage, Lady Bird Johnson Wildflower Center.

Most perennial asters produce the shoots for the next growing season between mid-summer and the first killing frost, although the timing of shoot emergence may vary depending on the species (Jones 1978). During the winter months, the winged leaf petioles and relatively few-flowered panicles may help to distinguish the remaining stalks of *Symphyotrichum lowrieanum* from those of similar species (Levine 1995). Lowrie's Aster blooms between mid-September and mid-October (Hough 1983), and the fruits are likely to mature within about a month (Jones 1978).

Pollinator Dynamics

In a typical aster, the pistillate ray florets are the first to become receptive. As the bisexual disc florets open their styles elongate and push the pollen to the end of the corolla tubes, coating the stigmas in the process. However, that does not result in fertilization because perennial asters like *Symphyotrichum lowrieanum* are physiologically self-incompatible and therefore essentially dependent on insects for the production of viable seeds (Jones 1978, Bertin et al. 2010).

Bees and flies are the primary pollinators of asters with light-colored flowers (Jones 1978). A study spanning multiple states in the Great Plains and Upper Midwest region analyzed pollen collected by honey bees (*Apis mellifera*) to evaluate forage resources for domesticated and wild bees, finding that the closely related *S. cordifolium* was one of the top native forbs utilized by honeybees and that *Symphyotrichum* was one of the genera most highly favored by the insects (Otto et al. 2020). In the northeast, at least six native bees have been identified as specialist pollinators of *Symphyotrichum* species (Fowler 2016). Hilty (2020) noted that while bees are particularly important pollinators for *S. cordifolium*, its flowers—and those of other *Symphyotrichum* species—are also visited by wasps, flies, butterflies, skippers, moths, and beetles.

Jones (1978) observed that many asters close at dusk, folding in their rays to preserve pollen for the next day. However, that does not occur in all species and may not apply to *Symphyotrichum lowrieanum*. A woodland mosquito (*Psorophora ferox*) has been documented visiting Lowrie's Aster during twilight hours in order to obtain nectar (Magnarelli 1980). Although Magnarelli did not discuss any potential role that *P. ferox* might play in fertilizing the flowers, mosquitoes have proven to be effective pollinators of other species in the Asteraceae (Peach and Gries 2016).

Seed Dispersal

Symphyotrichum lowrieanum usually has 20–30 potentially fertile florets but that is not a reliable indicator of productivity. Many aster species have a relatively low seed set (Jones 1978, Chmielewski and Semple 2001 and 2003, Lacroix et al. 2007), although Jones (1977) noted that *S. lowrieanum* plants had a very high seed set when they were maintained in a greenhouse.

The seeds of Lowrie's Aster are 2–2.5 mm long and have a persistent bristle-like pappus 2.5–4.5 mm in length (Brouillet et al. 2020). A pappus generally aids in wind dispersal by acting as a parachute, although differences in the morphology of both seeds and pappi determine how far the propagules of any given species are able to travel (Greene and Johnson 1990, Anderson 1993).

Seed dispersal distances can also be affected by wind velocity and the relative openness of the habitat (Lacroix et al. 2007).

The seeds of most asters require a period of dormancy before they are able to germinate (Deno 1993), though Jones (1978) found that some species were capable of germinating immediately. In natural settings, most aster seeds did not germinate prior to the first spring following their dispersal (Jones 1978). *Symphyotrichum lowrieanum* is capable of forming a persistent seed bank in the soil. *S. lowrieanum* was regenerated from turf cuts of Appalachian forest topsoils (Farmer et al. 1982) and was sprouted from propagules in the soil at two urban sites were it was not present in the vegetation (Janik and Stearns 1987). Koh and Bazely (1994) germinated Lowrie's Aster seeds from soil samples collected at multiple study sites in Ontario.

Habitat

Mac Elwee (1900) described *Symphyotrichum lowrieanum* as a forest species that grows in shaded places, and throughout much of its range the aster is primarily found in upland woods (Peattie 1931, Magnarelli 1980, Hough 1983, Scott 2009, Baranski 2021, Weakley et al. 2022). The typical canopy is dominated by deciduous hardwood trees (Farmer et al. 1982, Bunn 2008, Levy and Walker 2016). Lowrie's Aster has also been reported from disturbed sites such as dry fields and roadsides (Rhoads and Block 2007). Knoop (1984) indicated that *S. lowrieanum* made up less than 0.5% of the cover in a prairie habitat and Kapolka (2014) found that it comprised less than 1% of the cover in a transition area between a prairie and a woodland but was not present in either of the adjacent habitats.

A limited amount of information was found regarding how *S. lowrieanum* responds to various kinds of habitat disturbance. The species was able to establish from seed on amended soils from locations that had previously been surface-mined, suggesting that it could become part of the native flora on restored mining sites (Farmer et al. 1982). Moran (1984) examined the impacts that human activities on adjacent land had on the understory vegetation of forest edges and found that *S. lowrieanum* was more likely to occur in the marginal regions of woodlands that were adjacent to residential properties or roads than of those situated next to agricultural fields. In a comparative study of hardwood forests that had been intensively logged and unlogged forests, the initial sampling documented *S. lowrieanum* at three sites which had been logged a half-century earlier. When the sample was repeated nearly 30 years later *S. lowrieanum* was only found at one of the previously logged sites, and there were no records of the species at unlogged sites during either survey (Bunn 2008).

Wetland Indicator Status

Neither *Symphyotrichum lowrieanum* nor *S. cordifolium* (see Synonyms section) are included on the National Wetlands Plant List (NWPL). Any species not on the NWPL is considered to be Upland (UPL) in all regions where it occurs. The UPL designation means that it almost never occurs in wetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2022b)

SYLO2

Coefficient of Conservatism (Walz et al. 2018)

CoC = 7. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The map in Figure 1 depicts the extent of *Symphyotrichum lowrieanum* in the United States. The global range of *S. lowrieanum* also extends into Ontario (Weakley et al. 2022), although Koh and Bazely (1994) treated it as an introduced species in the province.

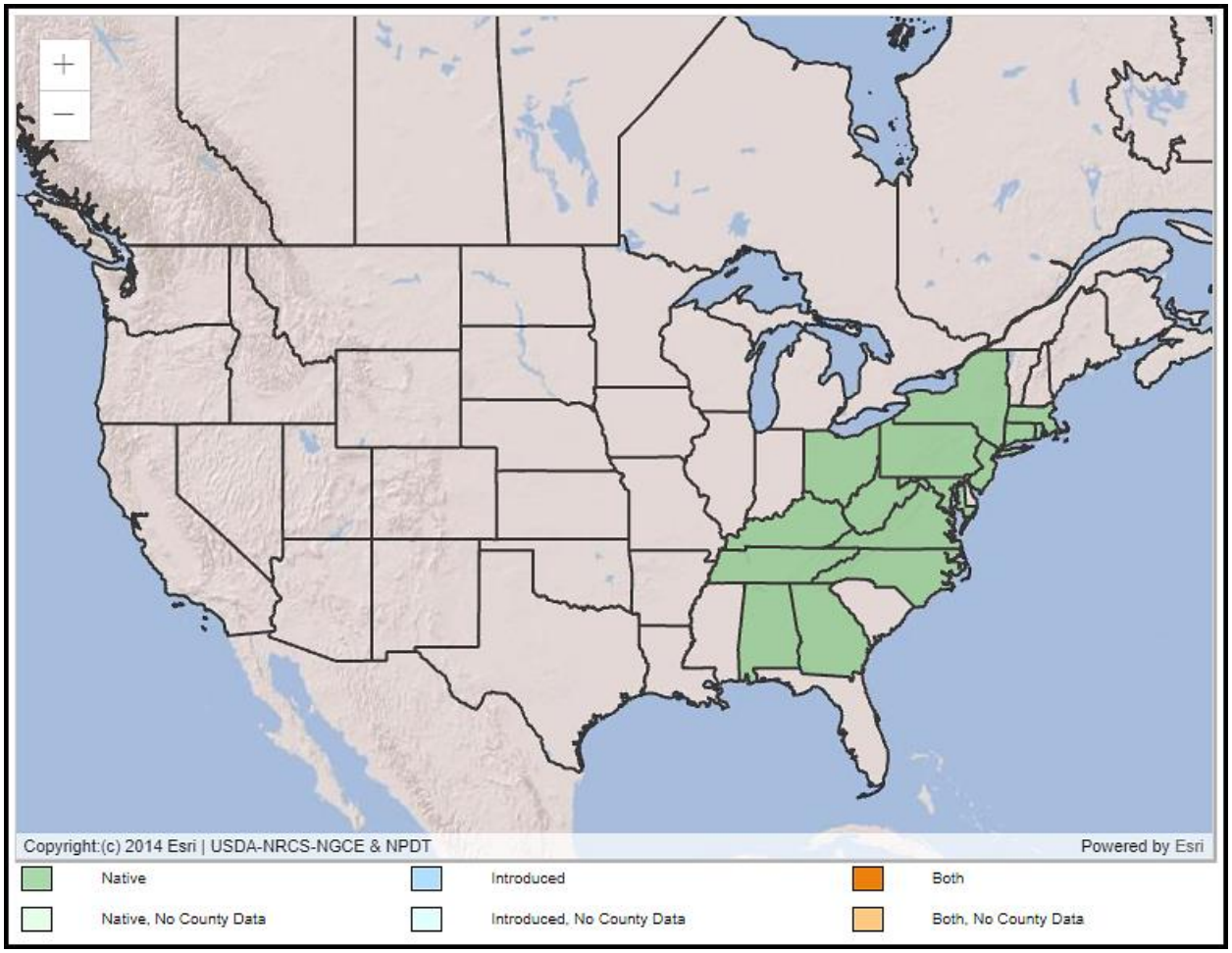

Figure 1. Distribution of S. lowrieanum in the United States (USDA NRCS 2022b).

The USDA PLANTS Database (2022b) shows records of *Symphyotrichum lowrieanum* in ten New Jersey counties: Bergen, Essex, Hudson, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, and Warren (Figure 2). The data include historic observations and may not reflect the current distribution of the species.

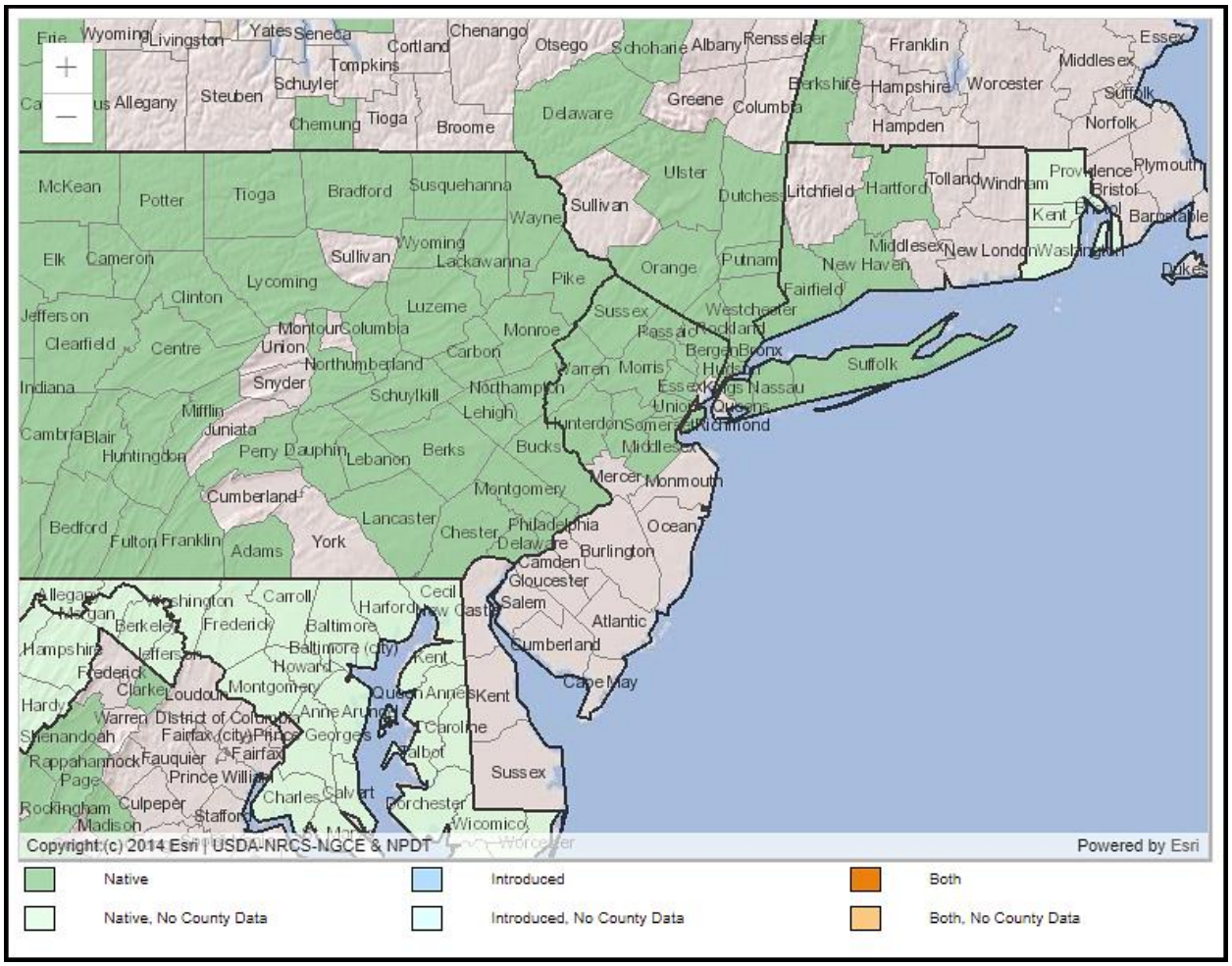

Figure 2. County records of S. lowrieanum in New Jersey and vicinity (USDA NRCS 2022b).

Conservation Status

Symphyotrichum lowrieanum is apparently secure at a global scale. The G4 rank means the species is at fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, although there is some cause for concern as a result of recent local declines, threats, or other factors (NatureServe 2022). The map below (Figure 3) illustrates the conservation status of *S. lowrieanum* throughout the United States. New Jersey is the only state where Lowrie's Aster is listed as imperiled (high risk of extinction). Throughout the rest of its range it is shown as secure, apparently secure, or unranked. However, the species has not been seen in New England for many years and regional records from states other than Connecticut are questionable (Go Botany 2022).

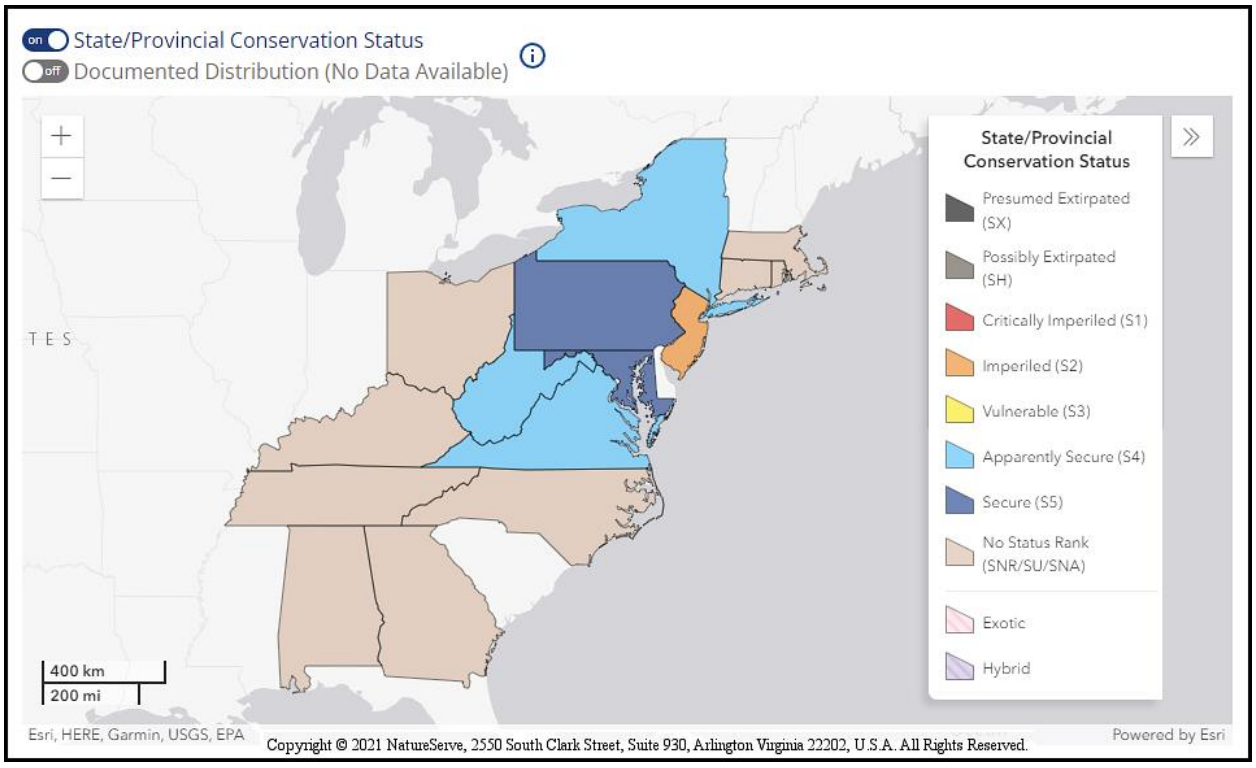

Figure 3. Conservation status of S. lowrieanum in North America (NatureServe 2022).

Symphyotrichum lowrieanum has only recently been ranked as imperiled (S2) in New Jersey (NJNHP 2022). The rank indicates that the species is very rare in the state, with 6 to 20 occurrences. Species with an S2 rank may have once been more abundant in the state but now persist in only a few of their former locations. *S. lowrieanum* has also been assigned a regional status code of HL, signifying that the species is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

Symphyotrichum lowrieanum was once regularly seen throughout the northern part of New Jersey. During the late 1800s, when the species was considered a variety of *Aster cordifolius*, Britton (1889) observed that *A. cordifolius* was common throughout the state and that the variety (now known as *S. lowrieanum*) appeared to be "at least as abundant as the species." Taylor (1915) reported records of Lowrie's Aster from eight counties in the northern and central parts of New Jersey. *Symphyotrichum lowrieanum* was recently added to the list of rare plant species tracked in New Jersey, and no more than ten occurrences can presently be confirmed as extant (NJNHP 2022).

Threats

The habitats of New Jersey's remaining *Symphyotrichum lowrieanum* populations have been impacted by non-native plant species, which may explain the apparent statewide decline of the aster (NJNHP 2022). As a result of the state's dense human population and long history of development, invasive flora has been able to proliferate and that has taken a particularly high toll on native plant communities (NJDSR 2021). Some particularly problematic species in north

Jersey's upland forests include *Berberis thunbergii*, *Lonicera japonica*, and *Microstegium vimineum*.

Lowrie's Aster may also face some threats from exotic fauna. In Ohio, the Hairy Spider Weevil (*Barypeithes pellucidus*) was reported to feed heavily on *Symphyotrichum lowrieanum* and the aster was identified as one of the insect's preferred local foodplants (Galford 1987). *B. pellucidus* is more often noted as a pest of woody plants. The weevils feed on roots during their larval stage and mature insects consume portions of leaves and stems (Coyle et al. 2011). The adults often feed gregariously (Galford 1987), which may result in more intense damage to individual plants. The Hairy Spider Weevil was introduced to North America from Europe more than a century ago and is now well-established throughout the United States and Canada (BugGuide 2022).

Some of the low seed set noted in various species of *Symphyotrichum* could be due to floral herbivory by small insect larvae, particularly by Lepidoptera but also by some Diptera and Coleoptera. Bertin et al. (2010) looked at ovary damage to the flowers of asters and goldenrods with bisexual disc florets and pistillate ray florets. They found that damage was usually greater in the disc florets than in the ray florets, which generally left the plants with some means of sexual reproduction. Nevertheless, in small or isolated populations of *S. lowrieanum* the net effect could inhibit short-term regeneration and limit seed bank development.

Management Summary and Recommendations

Because *Symphyotrichum lowrieanum* has only recently been tracked as a species of concern in New Jersey, a formal survey of all extant populations is needed. In addition to assessing the status of each occurrence, site visits can provide an opportunity to document the presence of invasive plant species and evaluate other potential threats. Since a number of authorities do not distinguish *S. lowrieanum* from *S. cordifolium* (see Synonyms section) there may be inadequate data on the distribution of Lowrie's Aster in some parts of its range.

Additional information is needed in order to plan effectively for the management of imperiled populations of *Symphyotrichum lowrieanum*. For example, it is not clear what governs the balance between germination and extended dormancy in the species, or whether the seedlings require fungal associations or other specific resources in order to become successfully established. No studies were found that focused on the ability of *S. lowrieanum* to tolerate variations in habitat characteristics or shifts in climactic conditions. Jones (1978) indicated that rhizomatous asters can easily be cloned, making *S. lowrieanum* an ideal subject for much the research that is required.

Synonyms

The accepted botanical name of the species is *Symphyotrichum lowrieanum* (Porter) G. L. Nesom. Orthographic variants, synonyms, and common names are listed below (Nesom 1994 and 1997, USDA NRCS 2022b). Some experts treat the species as a synonym for

Symphyotrichum cordifolium (Kartesz 2015, Brouillet et al. 2020, ITIS 2022, POWO 2022). Others (e.g. Weakley et al. 2022) recognize *S. lowrieanum* as a species but note that it may have originated as a hybrid of *S. cordifolium* and *S. laeve*.

Botanical Synonyms	**Common Names**
Aster lowrieanus Porter	Lowrie's Aster
Aster cordifolius ssp. *laevigatus* (Porter) A.G. Jones	Lowrie's Blue Wood Aster
Aster cordifolius var. *laevigatus* Porter	Lowrie's American-Aster
	Smooth Heart-leaved Aster
	Fall Aster

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